

pied Dr. Roberts's attention has also occupied mine, and that my results are identical with his.

In some of the experiments the procedure described by Dr. Roberts was accurately pursued save in one particular, which has reference to temperature. Small tubes with their ends finely drawn out were charged with a definite amount of caustic potash, and subjected for a quarter of an hour to a temperature of 220° Fahr. They were then introduced into flasks containing measured quantities of urine. The urine being boiled for five minutes, the flasks were hermetically sealed during ebullition. They were subsequently permitted to remain in a warm place sufficiently long to prove that the urine had been perfectly sterilised by the boiling. The flasks were then rudely shaken so as to break the capillary ends of the potash tubes and permit the liquor potassæ to mingle with the acid liquid. The urine thus neutralised was subsequently exposed to a constant temperature of 122° Fahr., which is pronounced by Dr. Bastian to be specially potent as regards the generation of organisms.

I have not found this to be the case, for ten flasks prepared as above described towards the end of last September, remained perfectly sterile for more than two months. I have no doubt that they would have remained so indefinitely.

Three retorts, moreover, similar to those employed by Dr. Bastian, and provided with potash tubes, had fresh urine boiled in them on September 29, the retorts being sealed during ebullition. Several days subsequently the potash tubes were broken and the urine neutralised. Subjected for more than two months to a temperature of 122° Fahr. they failed to show any signs of life.

These results are quite in accordance with those obtained by Dr. Roberts. His potash tubes, however, were exposed to a temperature of 280° Fahr., while mine were subjected to a temperature of 220° only.

With regard to the raising of the potash to a temperature higher than that of boiling water, M. Pasteur is in advance both of Dr. Roberts and myself. In a communication to the French Academy, on July 16 last, M. Pasteur showed that when due care is taken to add nothing but potash (heated to redness if solid, or to 110° C. if liquid) to sterilized urine, no life is ever developed as a consequence of the alkalisalation.¹

M. Pasteur has quite recently favoured me with sketches of the simple, but effectual apparatus, by means of which he has tested the conclusions of Dr. Bastian. Since his return from his vacation at Arbois, he has carefully gone over this ground with results, he reports to me, not favourable to Dr. Bastian's views.

I may add that I have by no means confined myself to the thirteen samples of urine here referred to. The experiments have already extended to 105 instances, not one of which shows the least countenance to the doctrine of spontaneous generation.

It gives me pleasure to refer to the skill and fidelity with which here, as in other cases, Mr. Cottrell has carried out my directions.

OUR ASTRONOMICAL COLUMN

THE NEW STAR IN CYGNUS.—In No. 2,115 of the *Astronomische Nachrichten*, Prof. Schmidt publishes the results of his observations on the intensity of light exhibited by this star between November 24, the date of its discovery, and December 15, when it was last perceptible to the naked eye. Having laid down his estimates of magnitude graphically on a large scale, he reads off therefrom the magnitude for every sixth hour, the differences showing a marked uniformity except about November 28, when the diminution of brightness was much more rapid. The magnitudes at midnight are as follow:—

	m.		m.		m.
Nov. 24 ...	2.97	Dec. 1 ...	5.27	Dec. 8 ...	6.44
" 25 ...	3.03	" 2 ...	5.47	" 9 ...	6.55
" 26 ...	3.14	" 3 ...	5.65	" 10 ...	6.64
" 27 ...	3.38	" 4 ...	5.81	" 11 ...	6.71
" 28 ...	4.06	" 5 ...	6.00	" 12 ...	6.79
" 29 ...	4.74	" 6 ...	6.16	" 13 ...	6.86
" 30 ...	5.06	" 7 ...	6.32	" 14 ...	6.92

In the forty-eight hours following November 27^d 18^h, there was a diminution to the extent of nearly 1½m. It is remarked that

¹ That alkaline liquids are more difficult to sterilise than acid ones was announced by Pasteur more than fourteen years ago. See *Annales de Chimie*, 1862, vol. lxiv. p. 62.

on the night of discovery its brightness was such as to render its near neighbour, 75 Cygni, invisible, while on December 14 and 15, 75 Cygni (6.4m.) in its turn nearly obliterated the new one; at 10 P.M. on the latter date it was only by great exertion of the eye that a trace of the star could be discerned. Prof. Schmidt did not remark any decided change of colour: it was at no time decidedly of an orange tint, but less ruddy than γ, ε, and ζ Cygni, yet of a full yellow, 5.6 to 5.8 on his scale.

The curve resulting from the Athens observations accompanies Prof. Schmidt's description, and for comparison with it similar curves are added to show the law of diminution to the limit of unassisted vision, in the cases of the so-called new stars of 1848 (Hind, April 27) and 1866 (Birmingham, May 12). The descent was slowest in the former case and quickest in the latter, but the curve for the star of 1848 appears to be drawn from a small number of observations. Prof. Schmidt assigns for the interval between discovery and disappearance to the unaided vision, twenty-five days in 1848, nine days in 1866, and twenty-one days in 1876; the writer is able to state that the star of 1848 was just perceptible without the telescope as late as May 27, four days after the termination of Prof. Schmidt's observations and thirty days after its discovery, and there was a decided check in the star's descent between May 1 and 6; on May 1 it was a little less than 20 Ophiuchi, and on May 6, certainly a little brighter than that star. On April 29 it was so nearly equal to ν Serpentis that close attention was necessary to decide which was the brighter; ν was found to be in a very trifling degree superior.

VARIABLE COMPONENTS OF DOUBLE STARS.—A suspicion of variability in the small companion of δ Cygni has been entertained by several observers, Prof. Secchi, among others, having remarked that the star has appeared single at times when the atmospheric circumstances would not afford an explanation. But the case of 72 Ophiuchi, No. 342 of the "Pulkova Catalogue" of 1850, is a much more suspicious one. The discoverer, M. Otto Struve, says, "I have very often looked at this star, and have many times noted it single. Yet on three occasions I have seen it double, always in about the same direction, and at a distance of 1".5. I do not know how to explain these discordances, except on the supposition that the satellite is very variable." Secchi found the star single at the epochs 1856.53 and 1857.71; at 1857.57 a doubtful companion was noted in the direction 345°.9, but at the epoch 1859.61 he records it "certainly double, and well separated," the measures giving the position 3°.75, and distance 0".608. This star does not occur in the more recent revision of the Pulkova list, by the Baron Dembowski.

To such cases may be added those of α Herculis and β Cygni, where the companions do not vary to such an extent as to cause the objects at times to appear single.

THE BINARY STAR γ CENTAURI.—While awaiting further measures of this fine double star, it may be remarked that admitting the measures of Sir John Herschel in 1835-36, to require an alteration of 180°, in order to render them comparable with those of Capt. Jacob and Mr. Powell, the latest published angle measured by the latter observer in 1860, indicates a motion in a retrograde direction of upwards of 160° between 1835.85 and 1860.68, the distance having increased about 0".4. The star will be in all probability one of comparatively short period, and, as such, deserves attention at the hands of southern observers. The alteration of 180° in Sir John Herschel's measures is quite justified by the near equality of the stars.

THE MINOR PLANETS.—M. Perrotin, of the Observatory at Toulouse, met with a small planet on January 10, in a region of the sky where it is probable that Nos. 77 and 149, Frigga and Medusa, are at present situated, and the same planet was detected some ten days later by Prof. Peters at

Clinton, U.S. On January 13, M. Borrelly, at Marseilles, also found a small planet distinct from that of Perrotin and Peters. It is remarked in M. Leverrier's *Bulletin*, that the first of these planets is unlikely to be Frigga, since the rough ephemeris in the *Berliner Jahrbuch* gives a contrary motion in declination. The object found by M. Borrelly, however, presents indications of identity, though a considerable correction of the elements of Frigga, brought up to 1874, December, by Dr. Powalky, would be required. If we employ these elements it will be found that with $\delta M = -3^{\circ} 17' 67''$, the computed and observed longitudes of Borrelly's planet on January 13 will agree, but there is an outstanding difference of $+1^{\circ} 39'$ between the latitudes. The comparisons with the observation on this date and one on January 15, are as follow:—

		Long. c-o		Lat. c-o
January 13	...	$0^{\circ} 0'$...	$+1^{\circ} 39' 1''$
" 15	...	$4^{\circ} 4'$...	$+1^{\circ} 36' 9''$

NOTES

THE eminent physicist, Prof. J. C. Poggendorff, for many years professor in the Berlin University and editor of *Poggendorff's Annalen*, has died in Berlin, in his 81st year. We hope to be able to give a memoir of Prof. Poggendorff next week.

THE eminent Belgian botanist, Prof. Bellynck, died at Namur in December.

THE first four names in the Cambridge Mathematical Tripos list, are Messrs. Donald McAlister, St. John's, Frederick M. de M. Gibbons, of Gonville and Caius College, R. C. Rowe and Mr. James Parker Smith, both of Trinity College. The Senior Wrangler, who was born at Perth in May, 1854, has had a most distinguished career as a student.

THE Society of German Naturalists and Physicians holds its annual session at Munich, February 18, and celebrates at the same time its fiftieth anniversary.

THE Council of the Royal Dublin Society have elected William Archer, F.R.S., Secretary for Foreign Correspondence to the Royal Irish Academy, as head of their Library Department, and the members of the Society, as well as the literary and scientific public in Dublin are to be congratulated on the occasion.

THE Russian Archæological Society holds its Annual Congress at Kasan, July 31.

ACCORDING to a Report of the French Minister of Public Instruction, the salaries of the Inspectors-General of Public Instruction, the Professors of the Collège de France, and the Professors of the Museum of Natural History, have been raised to 10,000 francs, and of the Professors of the School of Living Oriental Languages, to 7,500 francs.

IN 1855 Napoleon III. proposed a prize of 50,000 francs for the most important improvement made in the use of voltaic electricity during the previous ten years. The prize was last awarded to M. Ruhmkorff, who, it is known, is a German physician established in Paris. M. Waddington has recently appointed a jury to award the prize for the third time. Any improvement in any industry using voltaic electricity comes within the competition, consequently the sphere is a very wide one. Regulations will shortly be issued.

PROF. NORDENSKJÖLD proposes to take command of an expedition next year which will examine the Siberian coast from the mouth of the Jenissei to Behring Straits. The return journey will be by way of China, India, and the Suez Canal.

THE remarkable entomological collections of the late Dr. Breyer are to be purchased for the Royal Museum for Natural History of Brussels, for the very low price of 240*l*. They contain above 21,000 specimens of insects, classified by the late eminent entomologist.

WE observe that the following honorary members have been elected by the New York Academy of Sciences:—In this country, Mr. G. Bentham and Prof. Boyd Dawkins; on the Continent, Profs. Brandt, De Candolle, Milne-Edwards, Hoffmann, M. de Verneuil, and Herr von Siebold.

WE have lately alluded to the very large ethnographical additions made to the Berlin Museum by Dr. Lenz, Dr. Bastian, and Dr. Jagor. A still more valuable collection has lately been presented by Dr. Nachtigal, and is now in process of arrangement. It embraces a vast variety of objects gathered amidst widely-diversified tribes by this well-known traveller during his last extensive tour through Africa, and affords a rare opportunity for comparative ethnographical study.

A CREDIT of 13,668*l*. has been requested from the Belgian Chamber of Representatives by the Minister of the Interior, for the astronomical and meteorological observatory of Brussels. Besides the construction of new astronomical and magnetical instruments, this sum will be used for the enlargement of observations upon the periodical phenomena of vegetation. Special arrangements will be made for carrying on the observations in the garden of the observatory, on plants especially selected for the purpose from the double point of view of the botanical geography of the present time, and of the study of former climates of the earth.

THE Belgian Chamber of Representatives passed, on January 26, a resolution of great importance to geologists, allowing the necessary sums for the publication, first, of the beautiful coloured maps of the soils and sub-soils of Belgium, prepared about thirty years ago by André Dumont, on the scale of 1:160,000, and which are long ago out of print; and second, of the MSS. of Dumont, with his numerous geological sketches and drawings, and of the numerous notes he took during his travels in Belgium. The MSS., which were purchased by Government, are already arranged for publication, and their appearance, as well as that of the maps, is expected about the end of this year.

THE Belgian Geological Society is engaged in the elaboration of a scheme for the preparation and publication of a detailed geological map of Belgium, on a large scale. The idea of such a publication being already approved by the government, the point under discussion now is the best means of engraving the work, and the Society proposes to entrust the task to two special committees, geological and cartographical; both committees will be placed under a common directorship.

AT the session of the Berlin Anthropological Society on January 20 Prof. Virchow gave an extended account of a large collection of diluvial remains found in the neighbourhood of Weimar. They consisted of the bones of such animals as the elephant, rhinoceros, arctic bear, deer, wild swine, &c. Apart from their palæontological value, they are extremely important from an anthropological point of view, as among the bones are several flints, remains of fires, and peculiarly divided fragments of bone, all indicating the presence of man in company with the animals mentioned. Dr. C. Jung described the superstitious observances and use of charms and amulets among the aborigines of Australia. The bones of animals which have been eaten, or the bones of dead relatives are regarded with peculiar reverence by almost all of the tribes. There was also a discussion on the supposed Phœnician inscription lately found on a block of stone